

WHAT IS CLAIMED IS:

1. A method of identifying a modulator of an activity of a GPCR-like receptor comprising the following steps:
 - (a) contacting a test compound with a composition, wherein said
5 composition comprises an invertebrate GPCR-like receptor selected from the group consisting of polypeptides encoded by a polynucleotide having a sequence selected from the group consisting of SEQ ID NOS: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 104, 106, 108, 110, 112, 114, 116, 176 and 178, or a polynucleotide
10 hybridizing to said GPCR-like receptor under stringent conditions of hybridizing at 42°C in a solution comprising 50% formamide, 1% SDS, 1 M NaCl, 10% dextran sulfate, and washing twice for 30 minutes at 60°C in a wash solution comprising 0.1 X SSC and 1% SDS; and
 - (b) measuring the activity of said GPCR-like receptor in the presence
15 and absence of said test compound.
2. The method according to claim 1 wherein said GPCR-like receptor is a fragment of a GPCR polypeptide having at least one biological activity of said GPCR polypeptide.
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3. The method according to claim 1 wherein the activity of said GPCR-like receptor is the binding of a ligand.
4. The method according to claim 1 wherein the activity of said GPCR-like
25 receptor is the propagation of a transmembrane signal.
5. The method according to claim 1 wherein said method is selected from the group consisting of an ion flux assay, a yeast growth assay, a non-hydrolyzable GTP assay, a cAMP assay, an inositol triphosphate assay, and a
30 diacylglycerol assay.

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6. The method according to claim 1 wherein said GPCR-like receptor comprises an amino acid sequence selected from the group consisting of SEQ ID NOS: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 105, 107, 109, 111, 113, 115, 117, 177 and 179.

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7. The method according to claim 1 wherein said GPCR-like receptor comprises an amino acid sequence selected from the group consisting of SEQ ID NOS: 8, 22, 26, 36, 44, 105, 107, 109, 111, 113, 115, 117, 177 and 179.

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8. The method according to claim 1 wherein said composition further comprises a G-protein.

9. The method according to claim 8 wherein said G-protein is selected from the group consisting of $G_{\alpha 16}$, $G_{\alpha 15}$, $G_{q\alpha 5}$, G_{qs5} , $G_{q\alpha 5}$, and G_{q25} .

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10. The method according to claim 1 wherein said composition further comprises a peptide that binds to said GPCR-like receptor.

11. The method according to claim 10 wherein said GPCR-like receptor is encoded by a polynucleotide having the sequence set forth in SEQ ID NO:43.

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12. The method according to claim 11 wherein said peptide has a sequence selected from the group consisting of SEQ ID NOS:85, 86, 88, 89, and 118.

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13. The method according to claim 10 wherein said GPCR-like receptor is encoded by a polynucleotide having the sequence set forth in SEQ ID NO:21.

14. The method according to claim 13 wherein said peptide has a sequence selected from the group consisting of SEQ ID NOS:78, 79, 80, 84, 87,

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92, 98, 100, 120, 171, 143, 122, 123, 97, 85, 83, 101, 102, 93, 88, 91, 94, 93, 90,
152, 153, 154, 155, 156, 157, 80, 158, 119, 159, 160, 161, 162, 163 and 164.

5 15. The method according to claim 10 wherein said GPCR-like receptor is
 encoded by a polynucleotide having the sequence set forth in SEQ ID NO:45.

10 16. The method according to claim 15 wherein wherein said peptide has a
 sequence selected from the group consisting of SEQ ID NOS:86, 118, 125, 88,
 126, 127, 128, 129, 102, 131, 100, 133, 92, 135, 136, 137, 87, 139, 91, 141 and
 83.

17. The method according to claim 10 wherein said GPCR-like receptor is
 encoded by a polynucleotide having the sequence set forth in SEQ ID NO:35.

15 18. The method according to claim 17 wherein wherein said peptide has a
 sequence selected from the group consisting of SEQ ID NOS:99, 97, 96, 77, 82,
 81, 87, 100, 92, 80, 98, 120, 121, 79 and 84.

20 19. The method according to claim 10 wherein said GPCR-like receptor is
 encoded by a polynucleotide having the sequence set forth in SEQ ID NO:7.

25 20. The method according to claim 19 wherein wherein said peptide has a
 sequence selected from the group consisting of SEQ ID NOS:94, 103, 95, 101,
 85, 79, 84, 87, 86, 80, 92, 100 and 180.

21. The method according to claim 10 wherein said GPCR-like receptor is
 encoded by a polynucleotide having the sequence set forth in SEQ ID NO:106.

30 22. The method according to claim 21 wherein wherein said peptide has a
 sequence selected from the group consisting of SEQ ID NOS:80, 92, 98, 100,
 120, 121, 79, 84, 136, 87 and 86.

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23. The method according to claim 10 wherein said GPCR-like receptor is encoded by a polynucleotide having the sequence set forth in SEQ ID NO:104.
24. The method according to claim 23 wherein wherein said peptide has a
5 sequence selected from the group consisting of SEQ ID NOS:80, 92, 98, 100, 120, 121, 79, 84, 136, 87, 86, 150, 151, 133, 165, 91, 166, 131 and 167.
25. The method according to claim 10 wherein said peptide has an amino acid
10 sequence selected from the group consisting of SEQ ID NOS: 77-103 and 118-151.
26. The method according to claim 10 wherein said neuropeptide is attached to a label.
27. The method according to claim 10 wherein said label is selected from the
15 group consisting of a fluorescence label, a radioactive label, a chemiluminescence label, an enzymic label and an immunogenic label.
28. The method according to claim 1 wherein said modulator is an inhibitor of
20 said GPCR-like receptor activity.
29. The modulator identified according to the method of claim 1.
30. A composition comprising the modulator according to claim 29.
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31. A method of identifying a candidate anti-invertebrate modulator comprising the steps of: (a) contacting a test compound and a composition, wherein the composition comprises a GPCR-like receptor encoded by a polynucleotide selected from the group consisting of receptor polynucleotides
30 having a sequence set forth in SEQ ID NOS: 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 104, 106, 108, 110, 112, 114, 116,

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176 and 178, and polynucleotides hybridizing to said receptor polynucleotides under stringent conditions of hybridizing at 42°C in a solution comprising 50% formamide, 1% SDS, 1 M NaCl, 10% Dextran sulfate, and washing twice for 30 minutes at 60°C in a wash solution comprising 0.1 X SSC and 1% SDS ; and (b)
5 identifying a test compound that binds to or interacts with said composition as a candidate anti-invertebrate modulator.

32. The method according to claim 31 wherein the polynucleotide encoding said GPCR-like receptor comprises a sequence selected from the group consisting
10 of SEQ ID NOS: 7, 21, 25, 35, 43, 105, 107, 109, 111, 113, 115, 117, 177 and 179.

33. A method of identifying an anti-invertebrate agent comprising the following steps:
15 (a) identifying a modulator according to claim 1;
(b) contacting said modulator and an invertebrate tissue; and
(c) measuring the response of said invertebrate tissue, wherein the response is selected from the group consisting of neural signaling and neuromuscular activity, thereby identifying said modulator as an anti-
20 invertebrate agent.

34. The method according to claim 33 wherein said invertebrate tissue is selected from the group consisting of helminth tissues and insect tissues.

25 35. The method according to claim 33 wherein said invertebrate tissue is neuromuscular tissue.

36. An agent identified according to claim 33.

30 37. A composition comprising the agent according to claim 35.

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38. A method of producing an invertebrate GPCR-like receptor comprising the following steps:

- (a) incubating a source cell at a temperature of at least about 35°C;
- (b) lowering the temperature to at most about 26°C; and
- (c) detecting said GPCR-like receptor.

39. The method according to claim 38 wherein said cell is incubated at a temperature of at least about 37°C.

40. The method according to claim 38 wherein said temperature is lowered to at most about 28°C.

41. The method according to claim 38 wherein said cell is selected from the group consisting of a mammalian cell and an insect cell.

42. The method according to claim 38 wherein said recovering step comprises lysis of said cell.

43. The method according to claim 43 wherein said cell comprises a non-native polynucleotide comprising a nucleotide sequence encoding an invertebrate GPCR-like receptor.

44. The method according to claim 38 further comprising recovering said GPCR-like receptor.

45. An isolated GPCR-like receptor comprising an amino acid sequence selected from the group consisting of SEQ ID NOS: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 105, 107, 109, 111, 113, 115, 117, 177 and 179.

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46. The isolated GPCR-like receptor according to claim 45, wherein said receptor comprises an amino acid sequence selected from the group consisting of SEQ ID NOS: 8, 22, 26, 36, 44, 105, 107, 109, 111, 113, 115, 117, 177 and 179.
- 5 47. An isolated polynucleotide encoding a GPCR-like receptor selected from the group consisting of a polynucleotide comprising a sequence encoding the polypeptide according to claim 45.
- 10 48. The polynucleotide according to claim 47, wherein said polynucleotide comprises a sequence selected from the group consisting of SEQ ID NOS: 1, 3, 5, 7, 9, 11, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 104, 106, 108, 110, 112, 114, 116, 176 and 178.
- 15 49. The polynucleotide according to claim 48, wherein said polynucleotide comprises a sequence selected from the group consisting of SEQ ID NOS: 7, 21, 25, 35, 43, 104, 106, 108, 110, 112, 114, 116, 176 and 178.
50. A vector comprising the polynucleotide according to claim 47.
- 20 51. The vector according to claim 50 wherein said vector is an expression vector and said polynucleotide is operably linked to a polynucleotide comprising an expression control sequence.
- 25 52. A non-native host cell transformed or transfected with the polynucleotide according to claim 47.
53. A host cell transformed or transfected with the expression vector according to claim 51.

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54. The host cell according to claim 38 wherein said host cell is selected from the group consisting of mammalian cells, insect cells, yeast cells, helminthic cells, and bacterial cells.

5 55. The host cell according to claim 54 herein said host cell is selected from the group consisting of a COS cell, a CHO cell, an HEK293 cell, a Drosophila S2 cell, an insect Sf9 cell, an insect High-5 cell, and an *E. coli* cell.